Database Basics MS SQL Exam – 19 Feb 2017

Exam problems for the "Database Basics" course @ SoftUni. Submit your solutions in the SoftUni judge system at https://judge.softuni.bg/Contests/469/.
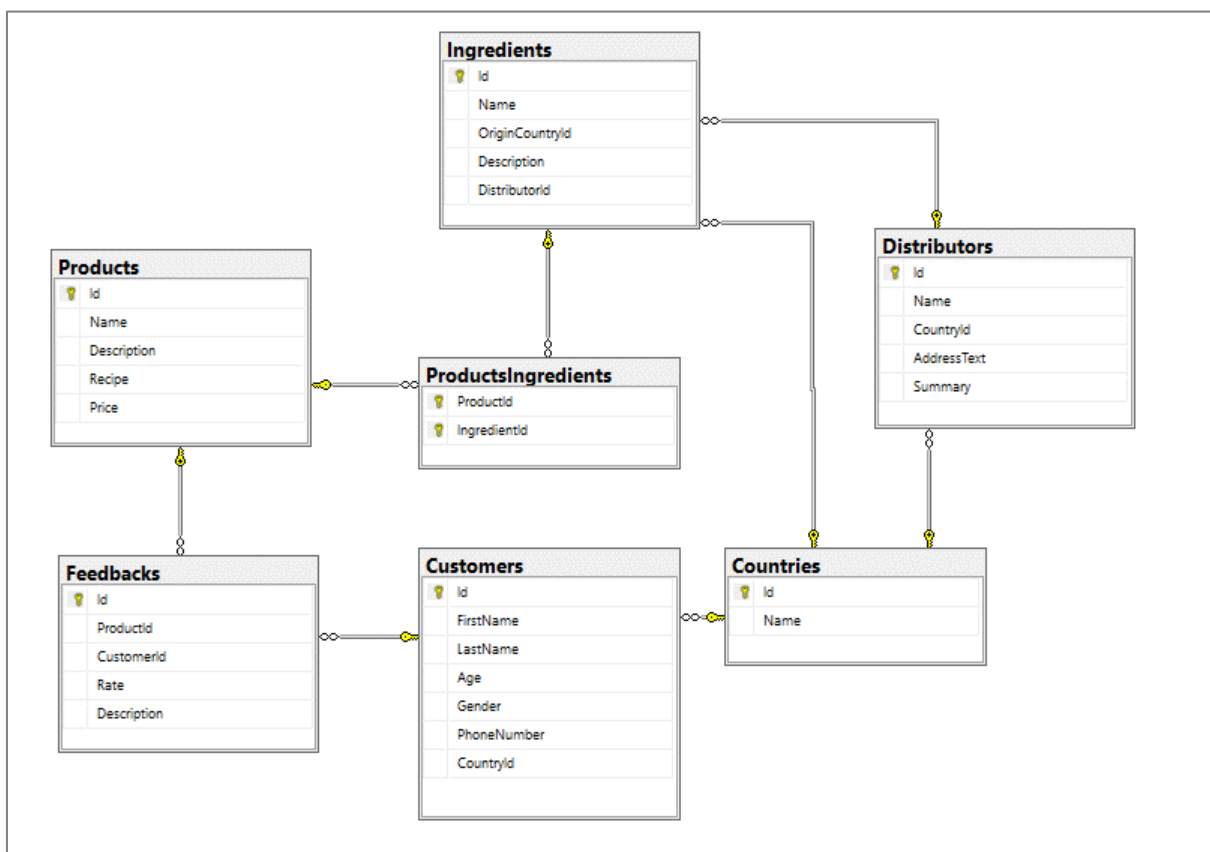
Database Fundamentals MSSQL – Bakery

Your friend is opening his "bio" bakery. Since he is a lucky one to have you as a friend/programmer you decide to take part of his new journey – selling healthy food to people. Based on his requirements you should create the initial database frame. Then you have to do some data manipulations. Finally, you have to do some work on the programmability part.

Section 1. DDL (25 pts)

For this section put your queries in judge and use: "*SQL Server run queries and check DB*".

You have been given the E/R Diagram of the bakery:

Crate a database called **Bakery**. You need to create **7 tables**:

- **Products** – contains information about the products that are being sold in our bakery.

- **Ingredients** – contains information about concrete fruits, vegetables, spices and so on. Has relation to both products and distributors.

- **ProductsIngredients** – mapping table between products and ingredients.

- **Distributors** – contains information about distributors – organizations that deliver ingredients.

- **Customers** – contains information about the customers that use our products.

- **Countries** – contains info for origin place (ingredients), general office(distributors) or homeland (customers).

Follow us:

- **Feedbacks** – contains information about the feedback that the customers give while evaluating some of the products

Customers

Column Name	Data Type	Constraints
Id	Integer from 0 to 2,147,483,647	Unique table identificator, Identity
FirstName	String up to 25 symbols, Unicode	
LastName	String up to 25 symbols, Unicode	
Gender	**Character** with **exactly** 1 symbol	Could be: '*M*' or '*F*'
Age	Integer from 0 to 2,147,483,647	
PhoneNumber	String 10 **characters** long.	String length is **exactly** 10 **chars** long.
CountryId	Integer from 0 to 2,147,483,647	Relationship with table Countries

Feedbacks

Column Name	Data Type	Constraints
Id	Integer from 0 to 2,147,483,647	Unique table identificator, Identity
Description	String up to 255 symbols, Unicode	
Rate	**Decimal** number with two-digit precision	Rate is between 0 and 10
ProductId	Integer from 0 to 2,147,483,647	Relationship with table Products
CustomerId	Integer from 0 to 2,147,483,647	Relationship with table Customers

Products

Column Name	Data Type	Constraints
Id	Integer from 0 to 2,147,483,647	Unique table identificator, Identity
Name	String up to 25 symbols, Unicode	Unique
Description	String up to 250 symbols, Unicode	
Recipe	String with unlimited number of symbols (**max**), Unicode	
Price	Decimal number used for **money** calculations	**Non-positive** numbers are not allowed

Ingredients

Column Name	Data Type	Constraints
Id	Integer from 0 to 2,147,483,647	Unique table identificator, Identity
Name	String up to 30 symbols, Unicode	
Description	String up to 200 symbols, Unicode	
OriginCountryId	Integer from 0 to 2,147,483,647	Relationship with table Countries
DistributorId	Integer from 0 to 2,147,483,647	Relationship with table Distributors

ProductsIngredients

Column Name	Data Type	Constraints
ProductId	Integer from 0 to 2,147,483,647	Unique table identificator, Relationship with table Products
IngredientId	Integer from 0 to 2,147,483,647	Unique table identificator, Relationship with table Ingredients

Distributors

Column Name	Data Type	Constraints
Id	Integer from 0 to 2,147,483,647	Unique table identificator, Identity
Name	String up to 25 symbols, Unicode	Unique
AddressText	String up to 30 symbols, Unicode	
Summary	String up to 200 symbols, Unicode	
CountryId	Integer from 0 to 2,147,483,647	Relationship with table Countries

Countries

Column Name	Data Type	Constraints
Id	Integer from 0 to 2,147,483,647	Unique table identificator, Identity
Name	String up to 50 characters, Unicode	Unique

Follow us:

1. Database design

Submit all of your create statements to Judge.

Section 2. DML (15 pts)

For this section put your queries in judge and use: "*SQL Server run skeleton, run queries and check DB*".

Before you start you have to import "*Скелет*". If you have created the structure correctly the data should be successfully inserted.

In this section, you have to do some data manipulations:

2. Insert

Let's **insert** some sample data into the database. Write a query to add the following records into the corresponding tables. All Id's should be auto-generated.

Distributors

Name	CountryId	AddressText	Summary
Deloitte & Touche	2	6 Arch St #9757	Customizable neutral traveling
Congress Title	13	58 Hancock St	Customer loyalty
Kitchen People	1	3 E 31st St #77	Triple-buffered stable delivery
General Color Co Inc	21	6185 Bohn St #72	Focus group
Beck Corporation	23	21 E 64th Ave	Quality-focused 4th generation hardware

Customers

FirstName	LastName	Age	Gender	PhoneNumber	CountryId
Francoise	Rautenstrauch	15	M	0195698399	5
Kendra	Loud	22	F	0063631526	11
Lourdes	Bauswell	50	M	0139037043	8
Hannah	Edmison	18	F	0043343686	1
Tom	Loeza	31	M	0144876096	23
Queenie	Kramarczyk	30	F	0064215793	29
Hiu	Portaro	25	M	0068277755	16
Josefa	Opitz	43	F	0197887645	17

3. Update

We've decided to switch some of our ingredients to a local distributor. Update the table **Ingredients** and change the **DistributorId** of "Bay Leaf", "Paprika" and "Poppy" to 35. Change the **OriginCountryId** to 14 of all ingredients with **OriginCountryId** equal to 8.

4. Delete

Delete all **Feedbacks** which relate to **Customer** with **Id** 14 or to **Product** with **Id** 5.

Section 3. Querying (40 pts)

You need to start with a fresh dataset, so recreate your DB and import the sample data again.

For this section put your queries in judge and use: "*SQL Server prepare DB and run queries*".

5. Products by Price

Select all **products** ordered by **price** (descending) then by name (ascending).

Required columns:

- Name
- Price
- Description

Example:

Name	Price	Description
Oxygen bread	27.39	Morbi ut odio.
Pizza(small)	27.27	In sagittis dui vel nisl. Duis ac nibh.

6. Ingredients

Find all ingredients coming from the countries with Id's of **1, 10, 20**. Order them by ingredient Id (ascending).

Required columns:

- Name
- Description
- OriginCountryId

Example:

Name	Description	OriginCountryId
Bouket	Small bundle of herbs wrapped in a cheesecloth bag or tied together and added in soups to add flavor (parsley thyme and bay…	10
Chives	Belongs to the onion and leek family. Source of vitamin A.	10

7. Ingredients from Bulgaria and Greece

Select **top 15** ingredients coming from Bulgaria and Greece. Order them by ingredient name then by country name (both ascending).

Required columns:

- Name

- Description

- CountryName

Example:

Name	Description	CountryName
Anise	The Greek name of anise "glykanissos" betrays its sweet character [glýka means sweetness]. It's best known use is in the famous ouzo, the Greeks' favorite drink for the summertime.	Greece
Cardamom	Cardamom has a strong piquant taste with lemon and pine notes. It is considered one of the most expensive spices and it is famous for its stimulating properties.	Greece

8. Best Rated Products

Select top 10 best rated products ordered by average rate (descending) then by amount of feedbacks (descending).

Required columns:

- Name

- Description

- AverageRate – average Rate for each product

- FeedbacksAmount – number of feedbacks for each product

Example:

Name	Description	AverageRate	FeedbacksAmount
Titanium breakfast	Proin risus.	9.920000	1
Octinoxate	Octocrylene	9.650000	1

9. Negative Feedback

Select all **feedbacks** alongside with the customers which gave them. Filter only feedbacks which have **rate** below **5.0**. Order results by ProductId (descending) then by Rate (ascending).

Required columns:

- ProductId

- Rate

- Description

- CustomerId
- Age
- Gender

Example:

ProductId	Rate	Description	CustomerId	Age	Gender
30	2.04	I did not like the product	23	27	M
27	4.16	Meh..	20	57	F

10. Customers without Feedback

Select all customers **without** feedbacks. Order them by customer id (ascending).

Required columns:

- CustomerName – customer's first and last name, concatenated with space
- PhoneNumber
- Gender

Example:

CustomerName	PhoneNumber	Gender
Rachel Bishop	0779574407	F
Irene Peters	0995086966	F

11. Honorable Mentions

Select **all** feedbacks given by **customers** which have at least **3 feedbacks**. Order them by product Id then by customer name and lastly by feedback id – all ascending.

Required columns:

- ProductId
- CustomerName – customer's first and last name, concatenated with space
- FeedbackDescription

Example:

ProductId	CustomerName	FeedbackDescription
3	Lisa Green	
6	Lisa Green	First food was not ok. Second I do not like sombreros. Third the music was bad.

12. Customers by Criteria

Select customers that are **either** at least 21 old **and** contain "**an**" in their first name **or** their phone number ends with "38" **and** are **not** from Greece. Order by first name (ascending), then by age(descending).

Required columns:

- FirstName
- Age
- PhoneNumber

Example:

FirstName	Age	PhoneNumber
Amanda	30	0886609909
Antonio	49	0781375797
Edward	55	0988359338

13. Middle Range Distributors

Select all distributors which distribute **ingredients** used in the making process of all products having average rate between **5** and **8** (inclusive). Order by distributor name, ingredient name and product name all ascending.

Required columns:

- DistributorName
- IngredientName
- ProductName
- AverageRate

Example:

DistributorName	IngredientName	ProductName	AverageRate
Alprazolam	Cinnamon	Nicotine Pleasure	5.260000
Arinase	Peppercorn	Panetone	5.400000
…	…	…	…

14. The Most Positive Country

Select the country which gave the most positive feedbacks. If there are several – print them all. Required columns:

- CountryName
- FeedbackRate – average feedback rate for each country

Example:

CountryName	FeedbackRate
Serbia	9.570000

Follow us:

15. Country Representative

Select all countries with their most active distributor (the one with the greatest number of ingredients). If there are several distributors with most ingredients delivered, list them all. Order by country name then by distributor name.

Required columns:

- CountryName
- DistributorName

Example:

CountryName	DisributorName
Albania	Arinase
Andorra	Allopurinol
Andorra	SPF 17
…	…

Section 4. Programmability (20 pts)

For this section put your queries in judge and use: "*SQL Server run skeleton, run queries and check DB*".

16. Customers with Countries

Create a view named **v_UserWithCountries** which selects all **customers** with **their countries**.

Required columns:

- CustomerName – first name plus last name, with space between them
- Age
- Gender
- CountryName

Example usage:

Query

```
SELECT TOP 5 *
  FROM v_UserWithCountries
 ORDER BY Age
```

CustomerName	Age	Gender	CountryName
Paul Wells	6	M	Philippines
Jeremy Banks	7	M	Brazil
Marie Hudson	7	F	Bulgaria
…	…	…	…

17. Feedback by Product Name

Create a **user defined function** that receives a product's name and returns its rating as a word, based on its average Rate. For rates lower than 5, return "**Bad**", for rates between 5 and 8 return "**Average**" and for rates above 8, return "**Good**". If a product has no feedback, return "**No rating**".

Parameters:

- ProductName

Example usage:

Query

<pre>SELECT TOP 5 Id, Name, dbo.udf_GetRating(Name)
  FROM Products
 ORDER BY Id</pre>

Id	Name	(No column name)
1	Octinoxate	Good
2	Tobacco Cake	No rating
3	Musaka	Good
…	…	…

18. Send Feedback

Each **Customer** should not have more than **3 feedbacks** per **product**. Your task is to create a user defined procedure (**usp_SendFeedback**) which accepts customer's id, product's id, rate and description. You should insert the data **but** if the user already has 3 feedbacks – **rollback** any changes and throw an **exception** with message "**You are limited to only 3 feedbacks per product!**" with Severity = **16** and State = **1**.

Parameters:

- CustomerId
- ProductId
- Rate
- Description

Example usage:

Query

<pre>EXEC usp_SendFeedback 1, 5, 7.50, 'Average experience';
SELECT COUNT(*) FROM Feedbacks WHERE CustomerId = 1 AND ProductId = 5;</pre>

Response
1

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19. Delete Products

Create a trigger that deletes all of the relations of a product upon its deletion.

Example usage:

Query
```DELETE FROM Products WHERE Id = 7```
Response
(1 row(s) affected)
(3 row(s) affected)
(1 row(s) affected)
(1 row(s) affected)

Section 5. Bonus (10 pts)

For this section put your queries in judge and use: "*SQL Server prepare DB and run queries*".

20. Products by One Distributor

Select all products which ingredients are delivered by only one distributor. Order them by product Id.

Required columns:

- ProductName
- ProductAverageRate
- DistributorName
- DistributorCountry

Example:

ProductName	ProductAverageRate	DistributorName	DistributorCountry
Octinoxate	9.650000	Lovastatin	Brazil
Salad	6.475000	Frova	South Korea
Banitsa	5.540000	Rabbitbush	Serbia
…	…	…	…